Preliminary Draft

Retirement, Saving, Benefit Claiming and Solvency under a Partial System of Voluntary Personal Accounts

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Abstract

This paper is based on an econometric model of retirement and saving, estimated with data for a sample of married men in the Health and Retirement Study. The model simulates how various features of a system of personal Social Security accounts would affect outcomes of interest. Outcomes include retirement, taxes paid, whether benefits are taken as an annuity or lump sum, and the level and course of benefits with age. We focus on three features of a system of personal accounts: whether personal accounts replace only a part of, or all traditional Social Security benefits; whether personal accounts are voluntary or mandatory; and the share of benefits that may be taken a lump sum rather than as an annuity. Among our findings: Under a system of partial personal accounts where retirement benefits increased by about a quarter compared to the current system, the fraction of 62 year olds at full time work would decline by about 22 percent. If the current system were replaced completely by personal accounts, so that total retirement benefits would increase by about 75 percent, the fraction at full time work would decline by about a third. If all benefits from personal accounts could be taken as a lump sum, the fraction not retired at age 62 would fall by about 5 percentage points compared to a system where there is mandatory annuitization of benefits. Unless annuitization is mandatory, there will be substantial diversion of benefits to age 62, reducing benefits received in one's 70s and 80s by as much as 20 percent.

JEL Numbers: H55, J26, J14, J32, E21, D31, D91, I3

This paper investigates how introducing personal accounts into a program of Social Security reform is likely to affect retirement, Social Security taxes, whether benefits are taken as an annuity or lump sum, and thus the level of benefits, and the course of benefits with age. It also considers a number of important design features. President Bush's Commission to Strengthen Social Security proposed a system with partial, voluntary personal accounts. Other prominent proposals, e.g., those contained in a series of papers by Martin Feldstein and Andrew Samwick (1998a, 1998b, 2001), include personal accounts that either fully or partially replace the current system. These accounts were to be mandatory rather than voluntary. Another important design feature specifies the extent to which benefits must be annuitized, and the share of benefits that may be taken as a lump sum.

We use a structural model of retirement and saving to estimate the likely effects of these and other design features on outcomes of interest. The interplay between the income effect of personal accounts, the additional crediting of benefits for work at older ages under a system of personal accounts, and the demand for liquidity and role of time preference in determining the timing of the cash out decision for personal accounts, all create a link to the timing of the retirement decision, and to the flow of benefits and taxes.

Among other factors, we specify the budget constraint to include minimum hours constraints requiring full time work or none at all on long term jobs, and lower wage offers in partial retirement jobs that in long term jobs. Also included are nonlinear benefit accrual profiles reflecting the benefit formulae of defined benefit pension plans, as well as nonlinearities created by various provisions determining traditional Social Security benefits.

Section II estimates the structural model of retirement and saving that underlies our analysis. Section III uses the model to examine the effects on retirement, benefits, taxes and other outcomes of alternative proposals for Social Security reform that include carve out personal accounts. Section IV concludes.

A Structural Retirement Model of Retirement and Saving

The model we use here updates estimates of a structural model of retirement and saving from our earlier work by including observations from the Health and Retirement Study through 2004.[1] An important feature of the model is that it allows for heterogeneity in tastes for leisure

[1] The description of the model presented here is taken from Gustman and Steinmeier (2005a and b).

and time preference. In our past work we simulated the effects of the President's Commission proposals for personal accounts (Gustman and Steinmeier, 2005b), but we did not consider the alternative design features that might be included in a system of personal accounts.

The model treats three retirement states (full time work, full retirement and partial retirement) wealth, and benefit claiming as jointly determined outcomes. In the basic model, the individual is assumed to maximize a utility function of consumption and leisure over time:

$$U = \int_0^T e^{-\rho t} \sum_{m=0}^{2} \{ s_{m,t} [\tfrac{1}{\alpha} C_{m,t}^{\alpha} + h_t \tfrac{1}{\gamma} L_{m,t}^{\gamma}] \} dt$$

Here, C is consumption and L is the utility value of leisure. t indexes time over the individual's adult life, and ρ is the time preference rate. m indexes three survival states for a married individual: both spouses are alive; only the respondent is alive; or only the spouse is alive. $s_{m,t}$ is the probability that the couple is in the survival state denoted by m at time t.

The relative value of leisure at time t is represented by the term h_t, where h_t is given by

$$h_t = e^{X_t \beta + \varepsilon}.$$

X_t contains a constant, an age variable, an indicator of poor health, and the birth year. The age variable increases the value of leisure smoothly over time as work becomes less attractive with age. As the value of leisure increases, at some point it surpasses the utility of the consumption that continued work makes possible, and the individual retires. It is important to note that the effects of age are gradual, and that unlike many models of retirement, in this model there are no terms in the preference function which would make retirement suddenly more desirable at specific ages such as 62 or 65. The parameter ε in the expression for h_t varies among individuals and reflects the fact that some individuals give leisure more weight than others. It is presumed to come from a normal distribution with zero mean and standard deviation s_ε.

Individuals working more than 30 hours per week and more than 1560 hours per year are classified as full-time. Those working more than 100 hours per year but less than 25 hours per week are classified as part-time. Individuals who fall between full-time and part-time or between part-time and retired are classified on the basis of self reports.

Leisure takes on a value of 0 for full-time work, 1 for full retirement, and ½ for partial retirement. The $1/\rho$ in the leisure term can be absorbed without loss of generality into the constant of the $X_t\beta$ linear form, and the remaining utility value of leisure $V_L = L^{\rho}$ takes on a

value of 0 for full-time work, 1 for full retirement, and V_p for partial retirement. V_p should be between 0.5 and 1 for permissible values of ?. We assume that each individual gets a random draw of V_p from the relevant part of the exponential distribution $k e^{\delta V_p}$. k is a constant necessary to normalize the distribution to integrate to unity between 0.5 and 1. In order to reflect that partial retirement becomes relatively more common at older ages, we allow this distribution to shift as the individual ages by specifying that $d = d_o + d_a$ Age. Thus the entire distribution of the preferences for partial retirement increases over time, although everyone maintains their relative position in the distribution.

These preferences allow for three types of heterogeneity. The time preference parameter ? is treated as a fixed effect whose value makes the wealth implied by the model consistent with the observable wealth in 1992 for each individual. The other two types of heterogeneity are e, the general preference for leisure, and L_p, the relative attractiveness of partial retirement. They are treated as random unobserved effects within the model, coming from distributions characterized by s_e, d_o and d_a.

This utility function is maximized subject to the asset constraint

$$A_t = (1 + r) A_{t-1} + W_t (1 - L_t) + E_t + B_t - C_t .$$

In this equation, A_t is the level of assets at time t, and r is the real interest rate. The next term $W_t (1 - L_t)$ is earnings, with the wage rate being either the full-time wage or the partial retirement real wage rate depending on the choice of L_t. E_t is the earnings of the spouse, including any pension benefits. B_t is the sum of the individual's own pension benefits and family Social Security benefits, both of which may be influenced by the individual's previous and current work decisions. C_t is consumption at time t. The Social Security benefits are determined by applying the current benefit formula to the individual's own earnings history, augmenting earnings records available through 1991 by self reported earnings and information on Social Security coverage reported in the survey instrument. Note that the pension and Social Security amounts are actual benefits, not accruals. This means that Social Security and pension wealth are not explicitly calculated but rather are implicitly determined by the fact that the benefits enter the asset constraint in future periods.

Estimation is based on the general method of simulated moments. We base estimates on random draws of parameters, and then simulate the model 10,000 times.

B. Data Source

The analysis is based on data from the first seven waves of the Health and Retirement Study, including data from restricted Social Security and pension data collected in the initial year of the survey. Simulations include married men only. These estimates use a real interest rate of 4.31 percent per year. This is the average compounded rate from 1926-2002 of an asset basket of 50 percent large cap stocks, 5 percent long-term bonds (treasury bonds) and 45 percent treasury notes, as measured by Ibbotson Associates.

C. Parameter Estimates

Table 1 reports parameter estimates. Appendix Table 1 (not shown due to the space constraint applied to conference papers) indicates reasons for deletions of observations from the sample. There are 46 moments in the estimation, leaving 38 degrees of freedom. The cutoff points of the chi-squared distribution are 53.15 for 5 percent, so the model is not rejected at the 5% significance level. The coefficients are of similar magnitudes to those in our earlier estimates. Everything except the vintage coefficient is significant. A key to understanding these results is in the time preference rates. These rates are heterogeneous, with 45 percent of the population exhibiting time preference rates above 5 percent, and one third exhibiting time preference rates above 20 percent.[2]

Table 2 reports both observed and simulated retirement outcomes under the current program, with included individuals having the work history they actually experienced, as reflected in own Social Security earnings record and reported job history. Comparing observed and simulated outcomes, the spike in retirements at age 62 is approximately the right height, although the spike at age 65 is 1 to 3 percentage points too low.

[2] Distribution of Time Preference Rates

0-.05	.05-.1	.1-.15	.15-.2	.2-.25	.25-.3	.3-.35	.35-.4	.4-.45	.45-.5	.5-.55
474	759	170	59	29	22	12	10	4	8	4
.55-.6	.6-.65	.65-.7	.7-.75	.75-.8	.8-.85	.85-.9	.9-.95	.95-1	>1	
2	1	4	2	1	1	2	1	2	664	

Policy Simulations

For the policy simulations, we use current law projections, meaning that the population is assumed to have been covered over their full lifetimes by the final set of Social Security rules now on the books. These rules include a normal retirement age of 67, a delayed retirement credit of 8 percent, and a payroll tax contribution of 10.6% of wages.

The policies are simulated by altering the budget constraint described above to build a baseline partial, voluntary personal account system. Further changes in the budget constraint are made to simulate the effects of changing various features of the system. Under each policy alternative, the individual is simulated to maximize lifetime utility. The incentives created by each alternative proposal generate behavioral responses, including, the choice to participate in a personal account, the histories of contributions to the personal account, retirement and claiming behavior. Given these behavioral outcomes, there is a string of tax contributions, benefits under the conventional system, and payments from the account.

Alternative policies will create different substitution and wealth effects. As long as benefits are higher with a personal account than without it, there will be a wealth effect that encourages earlier retirement. As for the substitution effect under the current system, a person who has been working 35 years may enjoy a gain in benefits from another year of work. Any gain in benefits will depend on the relation of (indexed) earnings in the marginal year to the lowest indexed earnings used in computing Average Indexed Monthly Earnings among all previous years of work. It also depends on earnings in other years. In contrast, the substitution effect under a system of partial accounts will depend on the relation of the interest on the personal account to the discount rate used to reduce (offset) conventional benefits. If the interest rate on the account exceeds the offset rate, then some of the taxes collected as retirement is postponed will be placed in the personal account and will raise future benefits even if the work in the marginal year does not raise AIME. Any enhanced substitution effect created here will encourage delaying retirement.

Because individuals differ importantly in their time preference, some individuals will value lump sum benefits over an actuarially fair annuity (Gustman and Steinmeier, 2005a). As a result, the timing of benefit acceptance and the course of retirement may be affected by the treatment of lump sum benefits under the personal account program.

Some initial caveats should be mentioned. There is no political agreement about how best to balance the finances of the Social Security system. Depending on how one weighs the resulting distribution, some may favor balancing Social Security's finances by reducing benefits, while other may favor increasing taxes. Since we don't know how the finances of the system will eventually be balanced, we focus on first round behavioral responses to introducing various features of personal account systems – and do not restrict all plans we compare to have the same financial implications for Social Security's actuarial deficit. The second major caveat pertains to the absence of adjustments for risk. Historical data suggest that even with a conservative investment strategy, personal accounts will be invested in a portfolio that generates a higher return than the offset accounts. But these expected value calculations are not adjusted for any differences in risk. Thus we use a long run historical return for a mixed stock and bond portfolio that is meant to be reasonably conservative. But we do not assume that when choosing whether to participate in personal accounts, participants discount the expected returns on the portfolio at a higher than historical rate to reflect additional risk. Nor do we assume they discount benefits to be paid under Social Security's traditional formula to reflect perceived political risk. Risk is taken into account in only one part of the analysis. Respondents are assumed to be aware that their life expectancy is stochastic, and they value the insurance provided by an annuity that their retirement incomes will last should they live longer than average.

A. Specification of the Personal Accounts

The personal accounts are presumed to work the following way. At the time the individual registers for benefits, the PIA is reduced to take into account the contributions to the personal account.[3] The resulting amount is the modified PIA. The personal account is divided

[3] We assume that benefits in the traditional account are reduced via a prorata method. The pro-rata method uses two hypothetical accounts. The first accumulates cumulatively the contributions to the private accounts at the offset rate of 2.5 percent real, which is the interest rate specified in the Commission's model 3. The second accumulates cumulatively the contributions to the traditional system, also at 2.5 percent real. Benefits are reduced by the percentage of the sum of the cumulative accounts that is due to the contributions to the private accounts. In the current law projection case, with partial accounts this is 4.0 / 10.6 = 37.7%, which is the amount by which traditional benefits are reduced. This applies to the individual's own benefits and the spouse's spouse and survivor benefits which are due to the individual's earnings.

Using an alternative offset method similar to that used by the President's Commission did not have major effects on the findings. In simulations with offsets, it was assumed that the personal accounts were mandatory. With certain returns in the personal accounts that were higher than the offset interest rate, the model would show that everyone would prefer the personal accounts were they voluntary. Here the contributions to the personal accounts are cumulated at the offset rate of 2.5 percent real. The resulting amount is then discounted to the normal

into two parts. One part is required to be annuitized into a real annuity at the real interest rate and brings the total of the PIA plus the required annuity up to a specified minimum level. The other part is allowed either to be taken as a lump sum or annuitized, as the individual prefers. The various features of the baseline package, and the variations on these features simulated with the model, are described in the following paragraphs.

First, in the baseline package of personal accounts, we assume that the accounts are financed with a 4 percentage point payroll tax rate taken from current payroll taxes. Alternatively, we examine the effects of using the entire 10.6 percent tax devoted to retirement benefits to fund the personal accounts.

Second, the baseline package assumes personal accounts are voluntary. Mandatory accounts are also explored. If the accounts are voluntary, total utility is calculated both with and without the personal accounts, and the individual is presumed to choose whichever yields the most utility. This is an either / or decision; either the individual eschews personal accounts completely or invests in them to the permissible amount. We do not examine the case where the contribution decisions can differ year to year. Nor do we examine cases where the wife's participation decision is different from the husband; if the husband chooses personal accounts, the wife does as well.

Third, the basic package assumes that the sum of the traditional benefit (PIA) plus required annuities from the personal accounts for the two spouses must reach the family poverty level. After that the beneficiary is free to take the payment as a lump sum, beginning at age 62. We also consider the effects of requiring complete annuitization from the personal accounts, and of allowing the personal accounts to be taken completely as a lump sum.[4] At the time of the individual's application, the sum of the individual's PIA plus the spouse's then current PIA is subtracted from the family poverty level. The difference is what the two required annuities must

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retirement age at 2.5 percent real and transformed into a single annuity at the same interest rate. This puts the offset computations on a comparable basis with the PIA, which is the traditional benefit available at normal retirement. Traditional benefits are then reduced by the ratio of this annuity to the PIA. The reduction applies to the individual's own benefit only, and not to any spouse or survivor benefits which depend on the individual's earnings record, since the offset account is annuitized with a single life annuity. A joint annuity would be very difficult to compute, since the spouse benefits depend on the relation of half of the individual's PIA to the spouse's PIA, and the applicable spouse's PIA may well not have been determined at the time the individual applies for benefits.

[4] We also considered the effects of requiring the sum of the adjusted traditional PIA plus the required annuities to reach the single person poverty level; or the sum of the adjusted traditional PIA plus the required annuities to reach the unadjusted traditional PIA level (which is the amount that would be calculated from the current formula). The larger the required annuity, the less influential lump sum benefits are on retirement decisions and on retirement benefits.

cover. The required annuity for the individual is the total required annuity times the ratio of the individual's PIA to the sum of the two PIA's.

There are other assumptions underlying the specification of the basic package of personal accounts. The earnings test is assumed to apply proportionately to the two benefits. That is, the test is applied to the sum of the traditional benefits plus the required annuities to calculate the percent of benefits that are lost.[5]

Personal accounts above the required level of annuitization are presumed to be available at age 62. It is difficult to conceive of a system that would apply the earnings test to the lump sums, since the lump sums are almost by definition amounts that are above the amounts required to achieve the desired level of annual benefits. Similarly, the fate of any new contributions to the personal accounts depends on the status of the accounts. If the required annuities do not exhaust the accounts, then the contributions would be available, plus interest, in the next year. If, however, the accounts are insufficient to bring the total annuities up to the required levels, then any new contributions would go to purchase additional annuities to narrow the shortfall.[6]

In addition to retirement outcomes, the simulations produce three types of outputs. First, we calculate what percent of individuals chooses personal accounts vs. traditional benefits only, in cases where there is a choice. Each simulation is done twice, one in which personal accounts are available and one in which they are not. The one with the highest lifetime total utility is presumed to be chosen. Since there is no uncertainty regarding the returns, almost all of the middle and high income households choose personal accounts, and most of the low income households do as well, especially those who retire at younger ages.

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[5] For instance, suppose that traditional benefits are $8,000 and the required annuities from the personal accounts are $4000. If the earnings test limit is $6,000 with a $1 reduction for every $2 in earnings above that amount, and if earnings are $20,000, then $7,000 [= 0.5 * (20,000 – 6,000)] in benefits are lost. Two thirds of this ($4,667) are lost from the traditional benefits and one third ($2,333) is lost from the required annuities from the personal accounts, since the unreduced traditional benefits are two-thirds [= 8,000 / (8,000 + 4,000)] of total unreduced benefits. The lost traditional benefits increase later traditional benefits in the usual fashion. For the benefits that are lost from the required annuity, the lost benefits are invested at the real rate of return, and the following year the amount is annuitized and added to the previous required annuity.

[6] We also analyzed whether the required and optional annuities purchased from the personal accounts are to be single life or joint and two-thirds annuities. The presumption is that the eventual regulations would probably require joint annuities, but this investigates whether there is any substantial change in behavior as a result. When single annuities are permitted, there is little change in retirement. But total benefits are higher under single annuities. A disproportionate amount of these benefits are taken at age 62, so that benefits received in one's late 70's or 80's are lower than in the basic package, despite the fact that total benefits are higher.

Second, we calculate the percent choosing annuities rather than lump sums for the part of the personal accounts above what is required to be annuitized. Third, the benefits by year are broken out between benefits from traditional Social Security and benefits from the personal accounts. There is a spike in benefits at age 62 reflecting the lump sums taken at that age. There is a secondary spike at age 70, but that is an artifact of the simulations, which assume that all individuals retired at that age.[7]

B. Simulations of Retirement Outcomes, Tax Payments and Benefits

Table 3 presents retirement outcomes at age 62 under alternative specifications of systems of personal accounts. The first three columns report the cumulative levels of the fractions of married men who are not retired, partially retired and fully retired. The last column reports the percent retiring from full time work at age 62.

For purposes of comparison, line 1 reports retirement outcomes assuming provisions of current law were fully implemented for the entire work lives of the sample of married HRS respondents. At age 62, almost 44 percent of the population of married men is projected to be fully retired, with almost 42 percent reporting themselves as not retired. Column 4 indicates that at age 62, 15.6 percent of married men are retiring from full time work. Line 1 of Table 4 reports the present value of the sum of taxes paid *from ages 50 to 69*, and the present value of Social Security benefits *over the lifetime.*

We next ask about adopting a baseline reform package with personal accounts, and then vary the features of the package as discussed above. The baseline package provides current law traditional benefits combined with the option of voluntary, partial personal accounts based on a 4 percent contribution of payroll taxes. The offset to traditional benefits is prorated, reducing benefits called for by the traditional formula by 37.7 percent (4/10.6) for those who choose a personal account. The personal account must be annuitized (with a joint and 2/3 annuity) until

[7] Although the returns on personal accounts can average out over time, there is a problem when the accounts are annuitized. If the annuities are variable annuities, similar to the annuities TIAA-CREF offers, the value of the benefits will fluctuate year to year, sometimes by substantial amounts, and this runs counter to having a reliable income stream during retirement. If the annuities are fixed in real terms, then it may make a great deal of difference when the annuitization takes place. An individual who annuitized in 2000, for instance, would have twice the annuity as another individual with similar lifetime earnings and contributions who annuitized in 2003. The unequal treatment of roughly equal individuals would make the differences involved in the "notch generation" debate small by comparison, and that debate generated a fair amount of heat. This annuitization problem may be substantial.

benefits reach the family poverty level. Required personal accounts are subject to the earnings test. As seen by comparing lines 1 and 2 of Table 3, the base package of personal accounts substantially increases retirements, raising the percent fully retired from 43.8 percent to 57.6 percent, while reducing the fraction not retired by 9.1 percentage points, and reducing the fraction partially retired by 4.7 percentage points.

There are two major forces operating to increase retirement under the baseline system of personal accounts. First, given the higher return to investment, the system of personal accounts raises total benefits in retirement, creating an income effect. Second, those in the population with a time preference rate well above the interest rate will accrue little saving, and will value a lump sum benefit over an annuity that is of equal present value when a market interest rate is used. When a lump sum is claimed, it is likely to be consumed over the next few years, driving down the marginal utility of income from work. As a result, many of those with a high rate of time preference will leave work at age 62. Thus column 4 of Table 3 shows that the fraction leaving full time work increases from 15.6 percent under the current system to 21.6 percent under the basic voluntary system.

Because retirements are earlier when the package of partial personal accounts is adopted, *total tax payments* are reduced. Tax payments *made from age 50 to 69* fall from $46,227 to $44,104. With no behavioral response and 100 percent participation in personal accounts, the decline in *taxes paid into the trust fund* due to diversion of taxes from conventional benefits to personal accounts is 37.7 percent (4/10.6). [8] Table 4 shows the decline in lifetime benefits from $328,955 to $199,878, or 39.2 percent. Thus the declines in benefits and taxes from adopting personal accounts are roughly of the same proportion. However, because taxes are reduced years before benefits are reduced, the movement to personal accounts does present a solvency problem. Given the assumption of a real return to the personal account portfolio of 4.31 percent per year, and the heavy pattern of participation in these accounts, the increase in *total* benefits,

[8] Two adjustments to this change are roughly offsetting. On the one hand, the actual decline in taxes is slightly greater than 37.7 percent because personal accounts induce earlier retirement and this reduces the total tax base. On the other hand, the actual decline in taxes is slightly less since our simulations suggest 5 percent of covered workers will choose not to accept the personal account, and these will mainly come from the ranks of low income workers.

i.e. the sum of benefits from the traditional system and from personal accounts, is substantial, rising from $328,955 to $410,434.[9]

Consider next the effect on retirement of a total conversion to personal accounts. Table 3 indicates that switching from a partial system of personal accounts, based on a payroll tax rate of 4 percentage points, to a complete system of personal accounts, would increase the fraction fully retired from 57.6% to 63.2%. The fraction not retired would decline from 32.8% to 27.9%, and there would be a .7% reduction in the fraction partially retired. As seen by comparing lines 2 and 3 of Table 4, adopting a complete instead of a partial system of personal accounts increases total retirement benefits from $410,434 to $577,009.

To isolate the effect of the lump sum benefit on retirements, the simulation in line 4 of Table 3 requires that all benefits from personal accounts be fully annuitized. This reduces the attraction of early retirement to those with a high rate of time preference. Requiring complete annuitization of benefits from the personal account would reduce the fraction fully retired down to 48.3 percent. Comparing lines 1, 2 and 4 of Table 3 suggests that 9.3 percentage points of the increase in the fraction fully retired from moving to a system of partial personal accounts results from the attraction of gaining access to a lump sum payment, and 4.5 percentage points of the increase in retirements are due to the income effect from receiving higher retirement benefits, net of the substitution effect resulting from a higher reward to work at later ages. Analogously, the fraction retiring at age 62 is 18.9 percent when full annuitization is required, up from 15.6 percent under the current system, but would rise to 21.6 percent under the basic, voluntary partial personal account plan where lump sum payments are available. There is a further effect from introducing personal accounts. Specifically, a 4.7 percentage point reduction in the fraction partially retired appears to be almost entirely due to the attraction of having lump sum benefits available through the introduction of personal accounts. When the package of personal accounts is introduced, partial retirement falls from 14.3 percent to 9.6 percent. Accordingly, introducing personal accounts reduces work effort by reducing both full time work and partial retirement.[10] However, 15 percent of the population chooses partial retirement when personal accounts are

[9] Again, this calculation does not take into account any risk premium either for stock market investment, or the political risk to current Social Security promises.

[10] The increase in the lifetime value of personal account benefits when the personal account must be fully annuitized is a reflection of the effect of additional work on earnings, and thus on benefits.

introduced, but lump sum benefits are not available, so the income effect from personal accounts explains almost none (and even a slight negative share) of the decline in partial retirement.

Alternatively, as seen in Row 5 of Table 3, if complete lump sum withdrawals were permitted, full retirement would rise to 60.3 percent, with only 31.2 percent not retired at age 62. Since 57.6 percent would be fully retired under a partial system of personal accounts (line 2), the minimum size of required annuities is not restricting many from choosing a lump sum benefit. From Table 4 we see that the further reduction in work effort associated with having the freedom to claim the entire personal account as a lump sum benefit reduces taxes paid from the plan requiring full annuitization by about 1.6 percent.

We also conducted a number of other simulations. We found that the choice of offset method used to reduce traditional benefits has little effect on retirement outcomes. Further simulations show the larger the required annuitization, and thus the smaller the lump sum benefits that can be claimed, the lower the retirement rate as a result of adopting personal accounts. Lastly, exempting the annuities from personal accounts from the earnings test will slightly increase work effort.

C. Participation in Personal Accounts

When we tabulate the proportion who choose personal accounts, since there is no stock market investment risk in this model, and the reduction in traditional benefits from diverting money to the personal accounts is below the expected return to personal account, most people choose to participate.[11] Only about 2 percent of all husbands from two-earner households choose not to participate, and among the bottom third of earners, 5 percent choose not to participate. When the individual is allowed to fully withdraw benefits in the form of a lump sum, participation in personal accounts rises to above 99 percent, with 98 percent of the low earners choosing to participate.

[11] In the above simulations, we did not use the offset method found in the President's Commission proposal, but used a proportionate offset method that makes personal accounts more attractive to those who are getting the lowest returns from the conventional system. For further discussion, see Gustman and Steinmeier (2005c). There we show that the offset method adopted by the President's Commission essentially taxes away the principal created in the private account from payroll tax deposits made in the name of the covered individual. That reduces the insurance the account would otherwise provide against unforeseen changes in Social Security benefits that might be adopted in the future.

D. Choice of Annuities, Social Security Benefits by Age, Lump Sum Payments and Implied Saving

Table 5 presents simulations for the basic package of personal accounts, relating the choice of lump sums vs. annuities to the actual age the person chooses to retire. As seen in the bottom row of that table, over the full sample, 46.2 percent choose a lump sum payment, 48.5 percent choose a voluntary annuity, and 5.4 percent do not have sufficient annuitized benefits to allow them to take a lump sum. That is, their annuity has a value below the family poverty level. The earlier one retires the greater the likelihood of taking a lump sum payment rather than annuitizing the funds in the personal account. For example, almost two thirds of those retiring in their early fifties choose to take a lump sum settlement when they reach age 62, while 40 to 47 percent of those retiring between 58 and 62 choose a lump sum settlement. Seventy percent of those retiring at exactly 62 choose a lump sum settlement. Among those retiring from age 63 on, only about a fifth will choose a lump sum settlement over annuitized benefits.

In those programs where lump sum payments are permitted, i.e., in rows 2, 3 and 5 of Table 6, the average benefit taken at age 62 is equal in dollar amount to two to four times the average yearly annuitized benefit paid at age 70. The effect of a large lump sum at age 62 is, of course, to reduce payments in later years. In contrast, as seen in row 4 of Table 6, in plans for personal accounts where full annuitization is required, the average benefit taken at age 62 is much lower than the average benefit at age 70, as many put off claiming benefits until a later age.

Implications and Conclusions

Our analysis suggests there is a wide array of behavioral responses to the introduction of personal accounts. Among our findings: Under a system of partial personal accounts where retirement benefits increased by about a quarter compared to the current system, the fraction of 62 year olds at full time work would decline by about 22 percent. If the current system were replaced completely by personal accounts, so that total retirement benefits would increase by about 75 percent, the fraction at full time work would decline by about a third. If all benefits from personal accounts could be taken as a lump sum, the fraction not retired at age 62 would fall by about 5 percentage points compared to a system where there is mandatory annuitization of

benefits. Unless annuitization is mandatory, there will be substantial diversion of benefits to age 62, reducing benefits received in one's 70s and 80s by as much as 20 percent.

Retirement responses are relatively modest, but the predicted increase in retirements should nevertheless be of concern to policy makers since they will further reduce the labor supply of older workers beyond the decline caused by the retirement of the baby boom. Similarly, those in the population with high time preference rates will have a greater tendency to retire at the age when lump sum benefits first become available.[12] Those with personal accounts who claim a significant portion of their benefits as a lump sum will have relatively low benefits at older ages. Moreover, these are the same people are likely to have relatively low saving in other forms.

Despite our effort to broaden the behavioral analysis to include various features that may accompany systems of personal accounts, we have simplified the behavioral analysis. Decision makers are imperfectly informed (Gustman and Steinmeier, 2004b), and consequently their participation and investment decisions may be influenced by defaults or other factors unrelated to returns (Madrian and Shea, 2001; Choi et al., 2003, 2004). The role of imperfect knowledge is not included in our model. Moreover, the only uncertainty built into the model concerns life expectancy. Depending on whether a person discounts traditional Social Security benefits or expected stock returns more heavily, one might have a greater or lesser tendency to participate in the personal accounts than our simulations suggest. Although we have taken into account the effect of earnings of spouses on the value of own, spouse and survivor benefits credited to the married men in our sample, we have not considered the implications of these reforms for behavioral responses by wives. Nor have we analyzed outcomes for single households. We have developed models that focus individually on these important dimensions of behavior (Gustman and Steinmeier, 2002, 2004c), but have not yet integrated these different lines of research in a single behavioral model.

[12] To be sure, if benefits are cut to bring them in line with taxes called for under current law, that would increase labor supply. For example, our simulations suggest that the proposals made by the President's Commission would substantially increase labor supply (Gustman and Steinmeier, 2005b).

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Table 1
Estimated Results

Symbol	Description	Coefficient Value	t-statistic
a	Consumption parameter	-0.16	2.60
	Parameters in ß		
$ß_0$	Constant	-10.01	246.52
$ß_a$	Coefficient of Age[a]	0.084	4.78
$ß_h$	Coefficient of Health[d]	4.71	4.54
$ß_c$	Coefficient of Cohort[b,d] (Year of Birth)	0.03	0.28
	Parameters in d		
d_0	Constant	-3.75	5.93
d_a	Coefficient of Age[c]	0.56	2.66
s_e	Standard Deviation of e[d]	5.11	6.06
	q value	52.11	
	Number of observations	2231	

Several variables are differenced from their approximate means in the sample in order to facilitate estimation. They are:

[a] The actual variable is age - 62.
[b] The actual variable is cohort - 1936.
[c] The actual variable is age - 65.
[d] These coefficients are all relative to the age coefficient, again to facilitate estimation.

Table 2: Observed and Projected Retirement Percentages

	Observed Retirement Percentages					Projected Retirement Percentages			
	Percentage Retiring		Percentage Retired			Percentage Retiring		Percentage Retired	
Age	From FT Work	Completely	From FT Work	Completely	***Observations***	From FT Work	Completely	From FT Work	Completely
50	4.1	3.3	4.1	3.3	*243*	4.5	3.1	4.5	3.1
51	0.9	0	5	3.3	*361*	1.4	0.9	5.9	4.1
52	2.7	2.2	7.6	5.5	*510*	1.7	1.2	7.6	5.3
53	2	1.1	9.7	6.6	*621*	1.5	1.1	9.1	6.4
54	2.1	1.3	11.8	7.9	*712*	1.9	1.4	11	7.8
55	3.1	2.7	14.9	10.6	*801*	3.2	2.4	14.2	10.2
56	1.9	2.1	16.8	12.7	*907*	3.2	2.4	17.4	12.6
57	4	3.2	20.8	15.9	*990*	3.5	2.8	20.9	15.4
58	3	2.1	23.8	18	*1064*	4.2	3.4	25.1	18.8
59	3.6	2.1	27.4	20.1	*1132*	4.5	3.6	29.6	22.4
60	6	6.4	33.4	26.4	*1121*	6.5	5.3	36.1	27.6
61	6.3	5.5	39.7	31.9	*1043*	5.4	4.3	41.4	32
62	15.1	12.5	54.8	44.4	*986*	14.8	10.3	56.2	42.2
63	5.6	3.4	60.4	47.9	*909*	6.2	4.9	62.4	47.1
64	6.7	6.7	67.1	54.6	*843*	5.9	4.9	68.2	52
65	9.1	6.7	76.2	61.3	*744*	6	5.3	74.2	57.3
66	4.5	3.9	80.7	65.2	*658*	4.5	4.1	78.7	61.3
67	2.8	2.9	83.5	68.1	*565*	4.2	4	82.9	65.3
68	3.1	3.3	86.7	71.4	*472*	3.7	3.3	86.6	68.6
69	1.7	4.6	88.4	76	*379*	3	2.6	89.7	71.3

Total number of observed respondents: *2231*

Table 3: Retirement Outcomes Under Alternative Systems of Personal Accounts

	Retirement Status at Age 62			
	Not Retired	Partially Retired	Fully Retired	Rate From FT Work
Program Features (variation from base package)				
1. Current law projections of traditional Social Security	41.9	14.3	43.8	15.6
Revised Systems with Personal Accounts				
2. Base package of personal accounts	32.8	9.6	57.6	21.6
3. Total conversion to personal accounts	27.9	8.9	63.2	23.3
4. Full annuitization required	36.7	15	48.3	18.9
5. Annuitization optional, full lump sum withdrawal permitted	31.2	8.5	60.3	23.0

Table 4: Tax Payments and Benefits from Social Security and Personal Accounts

	Sum Over Lifetime			
	Sum Taxes 50 to 69	Social Security Benefits	Personal Account Benefits	Total Benefits
Program Features (variation from base package)				
1. Current law projections of traditional Social Security	46227	328955	0	328955
2. Base package of personal accounts	44104	199878	210556	410434
3. Total conversion to personal accounts	42134	0	574346	577009
4. Full annuitization required	44685	199540	251026	450566
5. Annuitization optional, full lump sum withdrawal permitted	43950	199330	207820	407150

Base package = Current law traditional benefits, voluntary, partial (4% of contribution) accounts, prorated traditional benefits, annuitize to family poverty level, joint and 2/3 annuity, required personal accounts subject to earnings test.

Table 5: Percent Choosing Voluntary Annuities Under Base Package of Personal Accounts

Age Retired From FT Work	No Funds Available	Lump Sum	Voluntary Annuity
50	9	60.9	30.1
51	3.9	64.9	31.2
52	3.9	64.2	31.9
53	1.1	63.3	35.6
54	1.5	57.3	41.2
55	1.6	56.5	41.8
56	3	49.5	47.5
57	1.6	50.4	48.1
58	2.7	45.5	51.8
59	3	46.7	50.2
60	3.2	40.1	56.7
61	3.8	46.4	49.8
62	7.2	69.7	23.1
63	8.3	20.5	71.1
64	8.9	18.8	72.3
65	6.5	20.6	72.8
66	5.5	19.9	74.6
67	3	20.6	76.4
68	4.6	22	73.4
69	6.2	22.7	71.1
70	8.8	37	54.2
All	5.4	46.2	48.5

Table 6: Traditional Social Security Benefits Plus Lump Sum and Annuity From Personal Accounts by Age

Program Features (variation from base package)	**62**	**70**	**75**	**80**	**85**
1. Current law projections of traditional Social Security	3644	14620	13972	12073	9453
2. Base package of personal accounts	48114	17169	14459	12261	9609
3. Total conversion to personal accounts	92787	20119	17913	15041	11818
4. Full annuitization required	7005	19135	18137	15639	12235
5. Annuitization optional, full lump sum withdrawal permitted	51979	16919	14183	12012	9415

Base package = Current law traditional benefits, voluntary, partial (4% of contribution) accounts, prorated traditional benefits, annuitize to family poverty level, joint and 2/3 annuity, required personal accounts subject to earnings test.